***The Hot Dog Eating Champion***

 One-Step Inequalities

 **The Hot Dog Champion**

Joey “Jaws” Chestnut holds the world record for eating hot dogs. He ate 70 hot dogs in ten minutes! (The real-life number is actually 72, but we’re going to round down to 70 for this study guide.)

Nathan Frank wants to break Joey Chestnut’s record. (Nathan is not a real person. He’s made up for this study guide.) Nathan is trying to figure out how many hot dogs per minute he needs to eat.

 **1)** Will Nathan break the record if he eats 5 hot dogs every minute for ten minutes?

 **2)** Will he break the record if he eats 10 hot dogs per minute?

 **3)** At his next practice, Nathan eats 10 hot dogs in one minute. He realizes it is **very** difficult. He doesn’t think he can keep up that pace for a full contest. Can he slow down a little bit and still break the record? How much can he slow down? Explain your answer.

 If you are working with a group, discuss your responses to question #3 before moving on.

 **Warning** Competitive eating is dangerous. Many competitive eaters hurt themselves or cause health problems. Do not try to set any eating records until you are at least 18 years old.

 **Math Language**

 Nathan could write his question with a math sentence.

10 minutes \* (Eating Speed) > 70

Mathematicians like to use one letter to stand for a value that we don’t know. Let’s use the letter s for Nathan’s eating speed.

10 \* *s* > 70

We usually skip writing the multiplication symbol when we multiply by a variable. Both of these math sentences read “10 multiplied by s is greater than 70.”

 10*s* > 70

This type of sentence is called an inequality.

 **4)** What is the most important information from the section above?

 **Practice — Solutions**

Nathan would not break the record if he only ate 5 hot dogs per minutes. So “5” is not a solution to the inequality. If he ate 10 hot dogs per minute, then he **would** break the record, so the number “10” **is** a solution.

 **5)** Tell another number that is a solution.

 **6)** Tell another number that is not a solution.

 **7)** How many hot dogs per minute would he need to eat to *tie* with the record? Should we consider this number to be a solution?

 **The Shortcut**

From the previous question, we see that Nathan would tie with the record if he ate seven hot dogs per minute. Anything higher than seven will break the record. Would you rather list every single number that works? Or would you rather be a mathematician and use a shortcut?

 **8)** We’re trying to say that he Nathan needs to eat more than 7 hot dogs per minute. How do you write this in a math sentence?

s > 7

Answer to Question #8)

In English, this says, “His eating speed must be greater than 7 (hot dogs per minute)”. This is the best way to answer, because it shows **all** of the numbers that are solutions.

(Yep. That’s right. You should answer an inequality with an inequality.)

 **Tatiana’s Birthday**

Tatiana has invited 16 friends to her birthday party.

She tells her Mom, “It would be sooooo cool if everybody who came to my party could have a matching bracelet.”

“That’s a lot of bracelets, Tati,” her Mom replies.

“But I already have 5. And the Dollar Pine store has the exact kind of bracelet that I want.”

“Well, how many bracelets should you buy?” her Mom asks.

 **9)** How many more bracelets should Tatiana buy to make sure that all of her friends get one?

 **Tatiana’s Birthday, cont.**

 **10)** If your answer to the last question is correct, then that number is a solution to this question. List a number that is not a solution.

 **11)** List a different number that IS a solution.

 **12)** Write an inequality to describe the **question**.

 **13)** Write an inequality that describes all of the possible solutions.

 **Main Section**

 **14)** In the inequality g + 5 < 44, is the number 41 a solution? (Could you replace the g with an “8” to make a true statement?)

 **15)** Is the number 37 a solution?

 **16)** Write a solution inequality to show all possible solutions.

 **17)** 46 ≥ c – 8 Which of the following choices are solutions to this inequality?

50 51 52 53 54 55 56 57 58

 **18)** 16 – z ≥ 10 List two different numbers that are solutions to this inequality. List two different numbers that are not solutions.

 **Practice**

 Write the solution set for each inequality.

 **19)** b + 5 ≤ 19 **20)** 9z > 45

 **Notes**

 Questions #14 through #15 would make good notes.

 **Challenge**

 **21)** $18> \frac{ d }{3} $ What is the greatest whole-number solution?

 **22)** $e+10<85 $ What is the least whole-number solution?

 **Answers**

**1)** No **2)** Yes

**5)** Example: 11 **6)** Example: 4

**7)** 7 hot dogs per minute

**8)** s > 7

**9)** At least 11 bracelets **10)** Example: 8 bracelets

**11)** Example: 13 bracelets

**12)** 5 + b ≥ 16 (where p is the number of bracelets)

**13)** b ≥ 11

**14)** No **15)** Yes

**16)** g < 39

**17)** 54, 55, 56, 57, 58, and 59

**18)** Examples: 5 and 6 are solutions. 9 and 10 are not solutions.

**19)** b ≤ 14 **20)** z > 5

**21)** 52

**22)** 74